

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/NO2005/000013	International filing date (day/month/year) 10-01-2005	Priority date (day/month/year) 09-01-2004
International Patent Classification (IPC) or national classification and IPC See Supplemental Box		
Applicant Monsen Vavik Geir		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
 - a. ☒ (sent to the applicant and to the International Bureau) a total of 3 sheets, as follows:
 - ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input checked="" type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |

Date of submission of the demand 07-11-2005	Date of completion of this report 04-04-2006
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Tomas Erlandsson/MN Telephone No. +46 8 782 25 00

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/NO2005/000013

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Cover sheet

International patent classification (IPC)

H04B 3/36 (2006.01)

H04B 7/015 (2006.01)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

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Box No. I Basis of the report

1. With regard to the **language**, this report is based on:



the international application in the language in which it was filed



a translation of the international application into _____,
which is the language of a translation furnished for the purposes of:



international search (Rules 12.3(a) and 23.1(b))



publication of the international application (Rule 12.4(a))



international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:



the international application as originally filed/furnished



the description:

pages 1 - 18 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____



the claims:

pages _____ as originally filed/furnished

pages* _____ as amended (together with any statement) under Article 19

pages* 1 - 3 received by this Authority on 29-03-2006

pages* _____ received by this Authority on _____



the drawings:

pages 1 - 6 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____



a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:



the description, pages _____



the claims, Nos. _____



the drawings, sheets/figs _____



the sequence listing (*specify*): _____



any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).



the description, pages _____



the claims, Nos. _____



the drawings, sheets/figs _____



the sequence listing (*specify*): _____



any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

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Box No. IV Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has, within the applicable time limit:

- ☐ restricted the claims
- ☐ paid additional fees
- ☐ paid additional fees under protest and, where applicable, the protest fee
- ☐ paid additional fees under protest but the applicable protest fee was not paid
- ☐ neither restricted the claims nor paid additional fees

2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is:

- ☐ complied with
- ☐ not complied with for the following reasons:

4. Consequently, this report has been established in respect of the following parts of the international application:

- ☒ all parts
- ☐ the parts relating to claims Nos. _____

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-10</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-10</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-10</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Invention I (new claims 1-6 received 29-03-2006).

Documents cited in the International Search Report:

D1: EP 0735700 A2
D2: WO 0178249 A1
D3: US 4317216 A
D4: US 3911415 A

The cited documents represent the general state of the art.
The invention defined in claims 1-6 is not disclosed by any of these documents.

The cited prior art does not give any indication that would lead a person skilled in the art to the claimed analogue repeater system. Therefore, the claimed invention is not obvious to a person skilled in the art.

Accordingly, the invention defined in new claims 1-6 (received 29-03-2006) is novel and is considered to involve an inventive step. The invention is industrially applicable.

Invention II (new claims 7-10, received 29-03-2006).

Documents cited in the International Search Report:

D5: US 4475209 A
D6: US 20030078005 A1

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: BOX V

D7: US 3636453 A

D8: EP 1261148 A1

The cited documents represent the general state of the art.
The invention defined in claims 7-10 is not disclosed by any
of these documents.

The cited prior art does not give any indication that would
lead a person skilled in the art to the claimed analogue
repeater system. Therefore, the claimed invention is not
obvious to a person skilled in the art.

Accordingly, the invention defined in new claims 7-10
(received 29-03-2006) is novel and is considered to involve an
inventive step. The invention is industrially applicable.

CLAIMS

1. Analog signal repeater system (1) where frequency converting repeaters (6-9, 10-13) of any of super-heterodyne and super-regenerative type realised with
5 any of analogue and digital signal processing and realised with any of discrete semiconductors, MMIC semiconductors and ASIC semiconductors are applied to optimize signal dynamics by avoiding echo between repeaters (6-9, 10-13) and where each information channel (15, 16) repeater is of duplex type,
c h a r a c t e r i s e d b y the repeater system (7, 9, 12, 10) includes at least
10 one cascade (2, 14) which is satisfied using not more than two frequency bands for each information channel for repeating the signals while maintaining isolation against interference between repeaters and against reflections and signal echo.
2. Analog signal repeater system according to claim 1,
15 c h a r a c t e r i s e d b y frequency converting repeaters (38) of super-heterodyne or super-regenerative type being arranged with an intermediate frequency (33) which is suitable for interconnection with an adapter (36) for adaption of signal frequencies (37) and levels toward a commercially available data network node (36) of suitable type as with nodes for wireless networks based
20 on IEEE802.11x.
3. Analog signal repeater system according to claim 1
c h a r a c t e r i s e d b y (40) an adapter (41) performing frequency conversion of a high frequency signal (53) or microwave signal (53) to and from a network
25 node (42), corresponding to a modem (42) or correspondingly a PC adapter (42) for network communication and as an example a PC adapter (42) for wireless network using IEEE802.11x protocol by the adapter's (41) resultant frequency (45) being correspondingly (45) adaptable analog repeater (38) which may be connected at a any point (51) in an analog cascade (52).
- 30 4. Analog signal repeater system according to claim 1,
c h a r a c t e r i s e d b y an adapter solution (61) correspondingly (41) where in addition to a frequency conversion arrangement (64) a bypass signal path is arranged (63, 65 69), with or without frequency conversion, for return signal (63)

with, if necessary a stop filter (69) for the available frequency region in the forward direction (62) to achieve acceptable duplex conditons and where the application may be cable modems (73) or other.

5 5. Analog signal repeater system where a combination method (70) achieves isolation between input signal and output signal (73-76) for a repeater (70) with antennas (71, 72) as well as avoids reflections back to the repeater (70) characterized by the application of two frequency bands using two repeaters (82, 83) that repeat within same frequency band (74-76, 73-75) but
10 where two bi-directional, advantageously one-port repeaters (82, 83) contain differing frequency bands for the two signal directions (74-76, 73-75) to achieve isolation against interference between repeaters and against reflections and signal echo and where the isolation is further increased by additionally facilitating the use of separate amplifiers for input and output signals (77-80, 78, 79) as well as
15 oposite antenna polarisation or coupler polarity for the differing signal ports (73-74, 75-76).

6. Analog signal repeater according to claim 5,
characterised by the repeater arrangement to facilitate a built-in radio
20 interface (81) for interface communication which can be two-way.

7. Analog signal repeater system arrangement with analog repeaters of one frequency kind or frequency converting kind for transmission of large bandwidths on free standing conductors according to the Lecher principle on any metallic
25 conductor without insulation layer, with thin insulation layer or with insulation layer of loss angle and suitable for short wavelenghts all the way up to very short wavelenghts in the millimetre regions and where the wave propagation exhibit very low attenuation
characterised by the repeater arrangement (190, 210, 230) to apply
30 antenna like couplers in connection with one free standing conductor and which does not require galvanic coupling and where the couplers look in oposite directions out from the repeaters.

2 9 -03- 2006

8. Analog signal repeater (140, 150, 160) where a combination method (150, 160, 170) achieves isolation between galvanically coupled or direct coupled input and output signal ports (161, 162) for an analog repeater (70) of the one frequency kind or of the frequency converting kind as well as achieves dampening of reflections, signal interference and signal echo between repeaters, characterised by the application of toroids of magnetic or delectric kind (140) between cable terminations 161, 162, 163 whereby these can utilise an implicit impedance (189) or a combination of implicit and added impedance (189) to yield increased isolation between the repeater ports 161, 162, 163, likeså 171, 172 as well as cable terminations 165, 166 samt 178, 179.
9. Analog repeater system (250, 260, 310, 330, 360, 390) where a combination method (250, 260, 310) achieves isolation between none galvanic coupled or none direct coupled input and output ports (312-313, 331, 372-373, 372-380, 373-380) for an analog repeater (70) of one frequency kind or of frequency converting kind as well as achieving dampening of reflections, signal interference and signal echo between repeaters, characterised by the application of inductive coupler loop for none galvanic or none direct coupling that also can have incased efficiency with toroids of magntic or dielectric type (140) encircling both cable conductors and coupling loop and which is installed between cable terminations 161, 162, 163 and which thereby can utilise an implicit impedance (189) or a combination of implicit and added impedance (189) to yield increased isolation between the none repeater ports (312-313, 331, 372-373, 372-380, 373-380) as well as between cable terminations 165, 166 including 178, 179 including 311, 319, including 331, 332, including 361, 362 including 361, 280 including 362, 380.
10. Analog signal repeater according to claim 9, characterised by the application of a combination of none galvanic or none direct coupling and galvanic or direct coupling.